



# Prefabricated panelized passive house systems

## *A technology worth replicating*

### Fast facts

Technology: **Prefabricated passive houses**

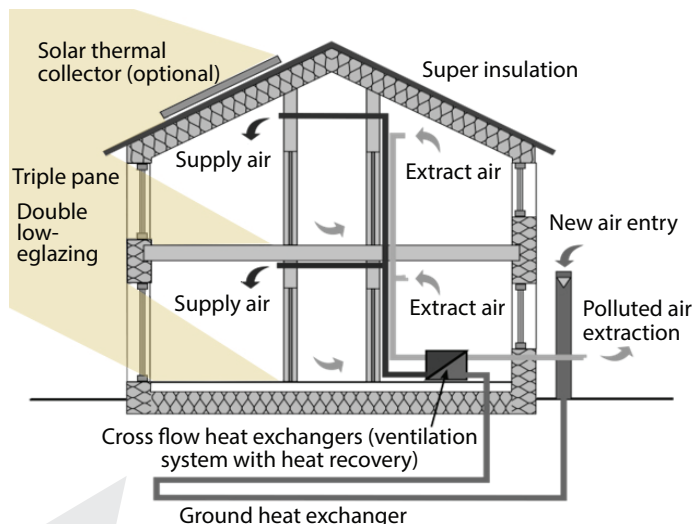
Replicability: **Good potential**

Capital cost investment: **\$4 to 5 million**

Output: **Prefabricated panels for the construction of customized homes and commercial buildings**

### Advantages of prefabricated panelized Passive House systems<sup>1</sup>

- Reduced ecological footprint
- Ultra-low-energy use buildings that require little energy for space heating or cooling
- Very well insulated and airtight yet allows diffusion to the exterior, thereby preventing mold or failures that can occur in airtight homes
- Sustainable: a passive house requires as little as 10% of the energy used by typical central buildings for heating and cooling
- Comfortable because of insulated frames keeping the floor and interior walls at the same pleasant temperature.



### Success story

BC Passive House makes a prefabricated panelized system for ultra-low-energy use buildings that meet the rigorous Passive House standard.

The Passive House standard is a voluntary standard for energy efficiency that reduces a building's ecological footprint and **energy requirement for space heating by 90%** compared to an average existing house.

### How it works

The Passive House prefabricated system is a mass wall system that is very well insulated and airtight yet allows diffusion to the exterior, thereby avoiding the failures that can occur in airtight homes.

Prefabricating the elements of the passive house creates several efficiencies:

- Quality control is increased.
- Waste debris is reduced.
- Construction costs and times are decreased.
- The panels arrive on-site with the option of having the insulation, windows, doors and/or siding already installed.
- Using components that have tighter joints improves the energy outcomes.

### Need funding?

Access the Canadian Business Network database of government grants, loans and financing options at [canadabusiness.ca/eng/program/search/](https://canadabusiness.ca/eng/program/search/) for opportunities in your region.

### Technology maturity (very high)

**Has the technology been implemented on a commercial scale outside of Canada?**

- The technology has been well adapted to northern climates and has gained a great deal of commercial traction in Europe. In fact, in Germany all new buildings are now required to meet the standard. The Passive House standard is gaining interest in North America and has tremendous potential.

### Ease of implementation (very high)

**How easy is the technology to replicate based on complexity of process, capital costs, or intellectual property issues?**

- The components of Passive House panels are commercially available, and construction techniques are similar to other types of prefabricated housing panels.

### Potential for replicability (high)

**Are there multiple sites available to facilitate such a project?**

- The replication potential for the Passive house systems is high, and the requirements for a facility are relatively low. As the technology's potential for energy conservation gains more recognition in North America, the opportunity for multiple facilities will increase.

### Market opportunities (high)

**Is the relative market size targeted by this technology accessible?**

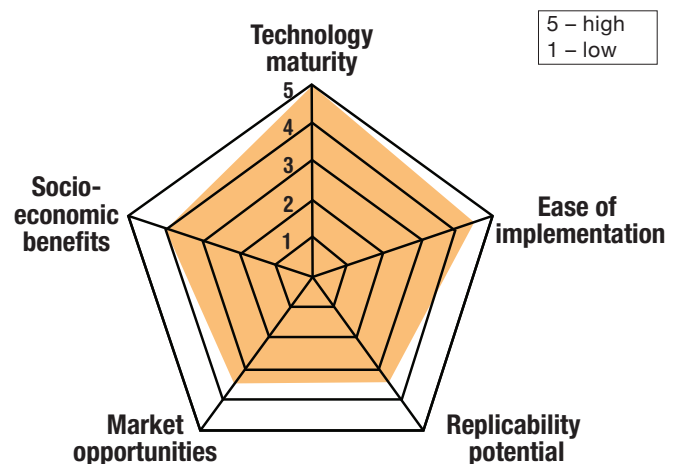
- Yes, these factory-built passive houses, coupled with their long-term energy savings, are narrowing the cost gap with traditional housing in several markets.
- Recent changes to provincial and federal building codes will further open markets in Canada for Passive House standard applications on both residential and commercial building sectors.

### Socio-economic benefits: (high)

**Does the project help job creation, environmental benefits, and industry transformation potential?**

- The energy required for heating and cooling buildings constructed to the Passive House standard in Canada would significantly reduce Canada's energy use and CO<sub>2</sub> emissions.
- Each house built using these prefabricated panels would effectively reduce greenhouse gas emissions by close to 2,400 tonnes annually.

### Replicability Radar Diagram



*Disclaimer: This replication analysis is based on the technology implemented under the project funded by IFIT. The IFIT program does not endorse any specific technology provider and has produced this brief analysis for the benefit of those considering implementing this type of project.*

### Is it suitable for you?<sup>2</sup>

- ☒ The main requirement of this process is industrial floor space, required for computer-controlled and manual panel design and assembly.
- ☒ The technology required for this process is not very different from that employed in homes built on-site.
- ☒ The main building component of the panels is Canadian wood: lumber, engineered wood and wood byproducts.

<sup>2</sup> "Analysis of Replicability Opportunities of Existing Investments in Forest Industry Transformation (IFIT) Projects within Canada." KSH Consulting, 2015.